Nonlinear Dynamic Analysis of the Transmission Tower-line System Subjected to Wire Breakage

AUTHOR(S):

Li, Yan; LIU, Hong jun; LI, Zhengliang; GE, Xu-zhang

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Yan LI[2], Hong jun LIU[1*,2], Zhengliang LI[1,2], Xu-zhang GE[2]

[1*] Key Laboratory of New Technology for Construction of Cities in Mountain Area (Chongqing University), Ministry of Education, Chongqing 400045, China
E-mail address: davidfwl@126.com (W. Fan).
[2] School of Civil Engineering, Chongqing University, Chongqing 400045, China

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Abstract

Taking a 500kv high-voltage transmission line as the research object, the fine finite element model of transmission tower-line system was established. By considering the collision and contact between the dropped wire and the ground, the nonlinear dynamic analysis at different break points or different numbers of broken wires were performed. The results shown that the location of break point is little impact for dynamic action when wire suddenly broken. The tension decay coefficient decreased with elevation in the side of broken wire, while it decreased first then increased in the other side. The tension coefficient of strain tower is far more than tangent tower. The dynamic amplification coefficient of strain tower is 1.1-1.5. Finally, torsional failure mode and bending failure mode of strain tower were studied in the unfavorable working conditions.

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